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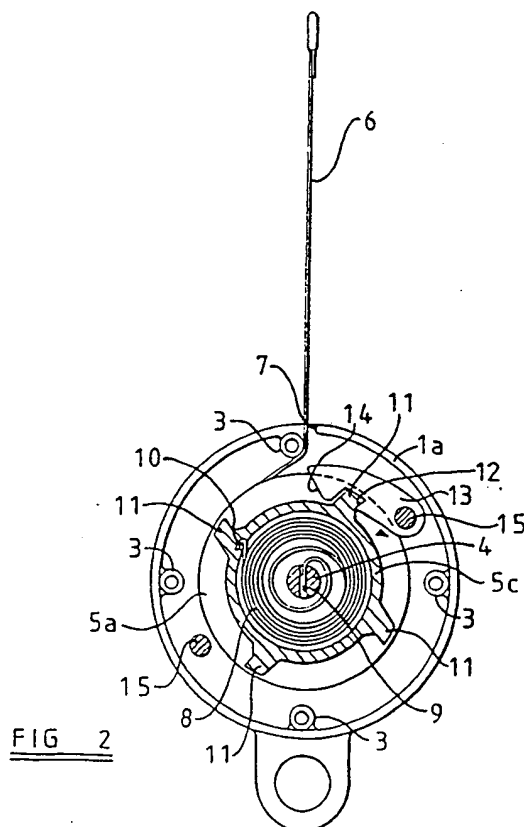
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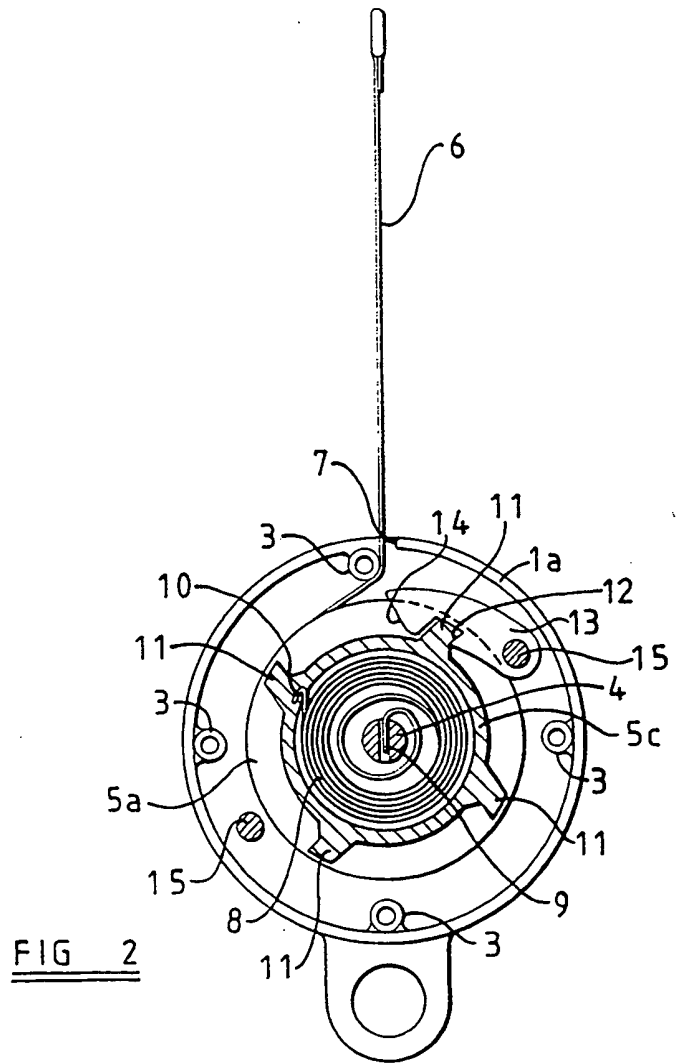
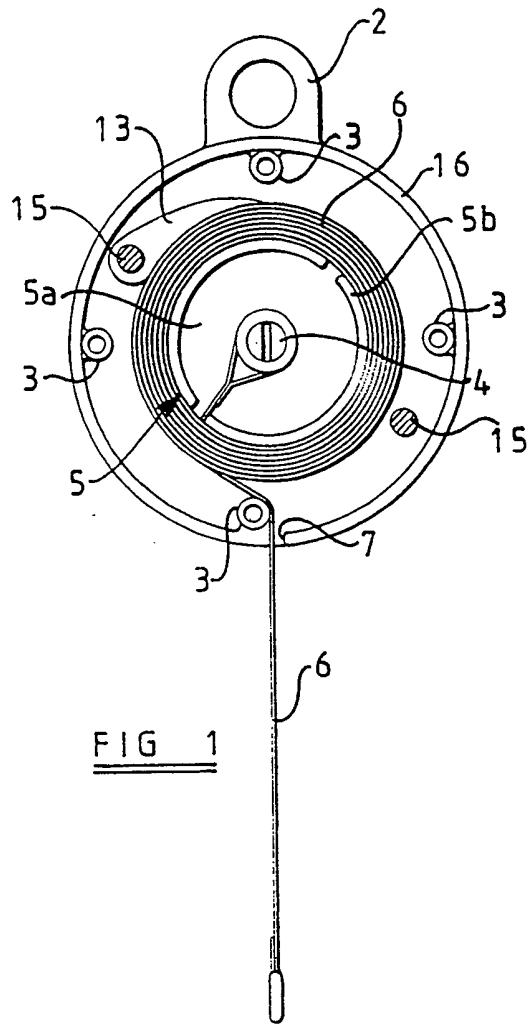
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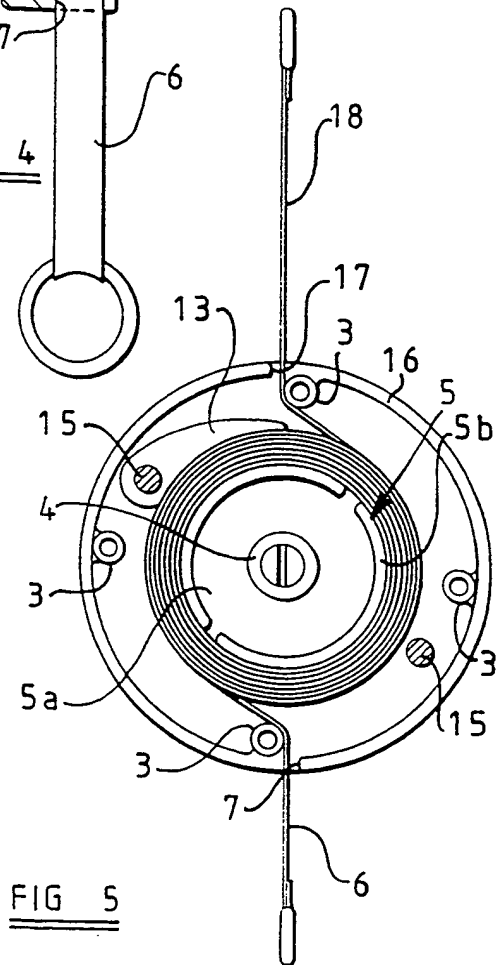
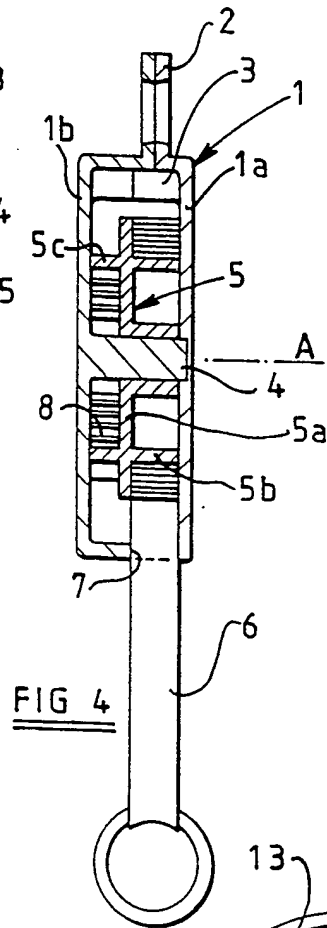
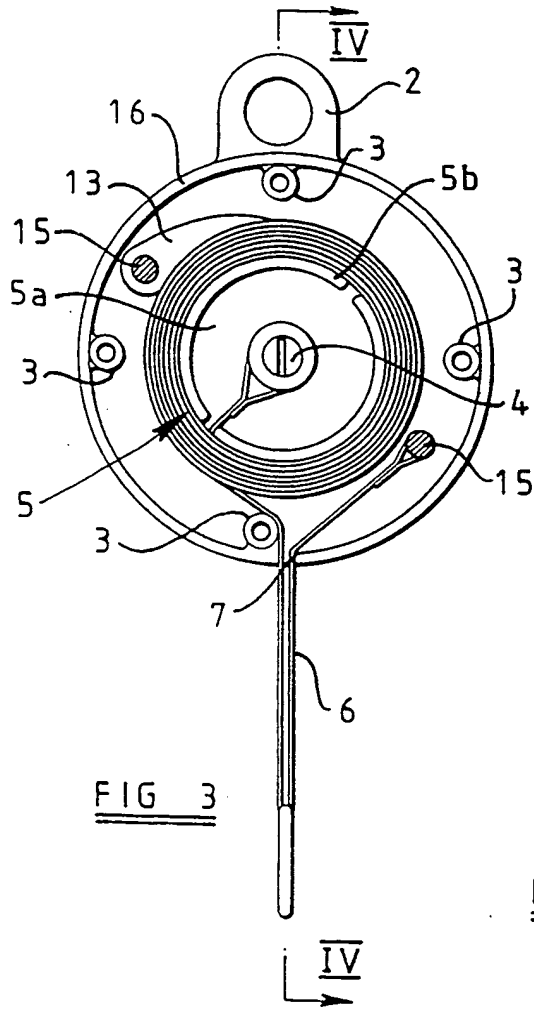
(54) Extendible suspension device

(57) An extendible suspension device, e.g. for a hanging basket, comprises a rotatable drum 5 (a, c), a flexible suspender member 6 wound on the drum and extendible therefrom, a spring 8 urging the drum in the winding-on direction, at least one projection 11 rotatable with the drum, and a pawl 13 with a notch or recess 12 engageable by a projection 11 for locking the drum against unwinding. When the suspender member 6 is unwound at or above a certain speed each projection 11 overruns the pawl 13 without operatively engaging the notch or recess 12. The device may have a number of pivot mountings 15 and/or pawls 13 to allow selective operation in different orientations. One end of the suspender member 6 may be attached to a pawl pivot 15 to form a double suspender member which may pass through a ring to which a load can be attached (Fig. 3), or two members 6 may be wound on the drum, one extending up and one down (Fig. 5).



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"SUSPENSION DEVICES"

The invention is concerned with extensible suspension devices in which an elongate flexible suspender member projects for a length which can be extended if and when desired. In particular, it is concerned with such a device in which a drum on which the extender member is wound is associated with a locking pawl mechanism which can be freed to allow the suspender member to be unwound at speed from the drum to increase its effective length and stopped at any desired position.

Devices of this general nature are known. For example, in EP 0 193 253 a suspension device is proposed comprising a flexible member wound around a drum and extensible by drawing it from the device and thereby rotating the drum against the action of spring means biasing the drum in the winding-on direction. A ratchet disc is rotatable in unison with the drum and spaced around this disc is a plurality of notches between which are arcuate lobes which so increase the height from one notch to the next that drawing-off of the flexible member at a relatively fast speed causes a pawl co-operating with the ratchet disc to ride over the notches into one of which the pawl will engage upon drawing off at a relatively slower speed to arrest the drum and prevent further drawing off.

The object of the invention is to provide a device which achieves the operational advantages of prior devices but is functionally more versatile with greater accuracy of control, whilst not requiring a ratchet disc with a complex profile as in said previous proposal.

To this end the invention, broadly speaking, provides a device which replaces the previously proposed notched and contoured ratchet disc/pawl arrangement with an arrangement comprising at least one eccentric projection rotatable with the drum, the pawl being notched or recessed for engagement by the projection. This is a more accurate and versatile arrangement, and the arcuate lobes of the prior proposal required to enable the ratchet disc to overrun the pawl are not needed, the engagement of the novel projection with the notched pawl serving to hold-off the pawl when the drum is rotated at a suitably fast speed.

Thus, according to one aspect of the invention, an extendible suspension device comprises a rotatably mounted drum, an elongate flexible suspender member wound on to the drum and extendible therefrom, means urging the drum in the winding-on direction, at least one eccentric projection rotatable with the drum, and a pawl with a notch or recess engageable by the projection to lock the drum against movement in the unwinding direction although when the suspender member is unwound at or above a certain speed, to extend the device, the projection can overrun the pawl without operatively engaging the notch or recess

therein.

Preferably said projection projects generally radially of the drum rotation axis and it may be one of a plurality of equiangularly spaced projections formed integrally with the drum, or on a member secured to or rotatably coupled with the drum. The pawl is preferably pivotally mounted about an axis parallel to the drum rotation axis, and it is conveniently gravity urged for engagement with the projection(s). Alternative pivot mountings for the pawl (or alternatively operable pawls) may be provided, to allow selective operation of the device in different orientations. For example, two diametrically opposite pivot mountings will allow the main body of the device to be inverted so that it can be employed either with the body fixed and the load suspended on the suspender member, or with the end of the latter anchored and the load directly suspended from the body.

The body is conveniently a two-part circular moulded structure, and the or each pawl pivot may be pivot stubs moulded integrally with the body, stubs moulded integrally with the pawl and engaging aligned bores in the two body parts, or separate pivots elements located in the body. The suspender member is preferably a flexible webbing or tape wound on the drum as a single width spiral.

The body may be moulded with an apertured suspension lug or other anchoring/attachment means. However, such means may alternatively be omitted and the

suspender member be one of two such members which are wound on the drum as mutually interleaved spirals and which extend from the body in diametrically opposite directions. In this case the device is used with one of the flexible members anchored and the load suspended on the other, with the body of the device suspended midway between the anchorage and the load. This provides a device which will sustain the same suspension load whilst providing double the extension movement per drum revolution.

When a single suspender member is employed anchorage means for the end of the suspender member may be provided on the body with the load suspended from a slidable attachment on the doubled suspender member. This results in less stressing of the body but has the principal advantage of enabling double the load to be suspended, although this is at the expense of extension movement being halved per drum revolution. These anchorage means may be one of said alternative pawl pivot mountings which is not at the time being used to mount the pawl.

The drum is preferably urged in the winding-on direction by a torsion spring, conveniently a flat wound spring, disposed within the drum.

The invention will now be further described with reference to the accompanying drawings which illustrate a preferred embodiment and a modification thereof. In the drawings:

Fig. 1 is a front view with a cover part of the device

housing removed;

Fig. 2 is a rear view with a rear part of the housing not shown and with the device employed in an inverted position;

Fig. 3 is a view similar to that of Fig. 1 showing an alternative arrangement doubling the load capacity;

Fig. 4 is a vertical cross-sectional view on the line IV-IV in Fig. 3; and

Fig. 5 is a view similar to Fig. 1 but illustrating the modification.

The device of Fig. 1 to 4 comprises a two-part moulded plastics housing 1 of circular shape, with a front cover part 1a and a rear part 1b. Overlapping peripheral projections of the housing parts 1a and 1b provide an apertured attachment or anchorage lug 2, and the housing parts have internal snap-together fixings 3 which provide easy and quick manual assembly of the housing around the internal components which are first assembled into the rear housing part 1b.

A central mounting pivot 4 moulded integrally with the housing part 1b provides the pivot mounting for a drum moulding 5. This has an intermediate radial flange 5a supporting a front drum section 5b on which is wound a length of flexible webbing or tape 6 providing an elongate suspender member extending from the housing 1 through a peripheral slot 7 diametrically opposite to the lug 2. Between the drum and the slot 7 the tape 6 is smoothly

guided over one of the fixings 3 as shown in the drawings. At the rear of the flange 5a the drum moulding 5 is formed with an annular section 5c within which is housed a flat wound torsion spring 8 for urging
5 the drum moulding 5 in the winding-on direction so as to wind in the tape 6 and shorten the effective length of the device. In use the suspended load, for example a hanging flower basket, is of a weight such as to apply to the drum an unwinding torque which is greater than
10 the winding-on torque applied by the spring. The inner end of the spring 8 is anchored in a cross-slot in the pivot stub 4, and the outer end is anchored at 10 (see Fig.2) to the inner side of the annular section 5c.

The annular section 5c is formed with four
15 equiangularly spaced and generally radial projections 11. In the static condition one of these engages a notch 12 in a pawl 13, as shown in Figure 2, to lock the drum against rotation in the unwinding direction against the net unwinding torque applied by the suspended load.
20 Thus the load remains suspended at a fixed height depending on the unwound length of the tape 6. If it is desired to lower the load, for example to water a suspended hanging basket, it is lifted slightly so that the spring 8 turns the drum in the winding-on direction
25 sufficiently to raise the pawl 13 clear of the engaged projection 11, the projection 11 and the notch 12 being suitably inclined and shaped to provide this reverse action. With the pawl thus freed the

load can be lowered, at a suitably fast speed, to the desired level at which the movement is slowed to allow the pawl 13 to be engaged by the next projection 11. The minimum lowering speed is that at which a projection 11 engages the inclined nose 14 of the pawl 13 with a force which lifts the pawl sufficiently for it to remain clear of that projection as the latter passes below the notch 12.

The pawl is urged inwardly, for operative engagement by the projections 11, solely by gravity and it is mounted on one of two alternative pivots 15. These are diametrically disposed with respect to the drum rotation axis A and parallel thereto. Figs. 1 and 3 show how one of the pivots 15 is used when the device is employed with the body 1 fixed above and the tape 6 hanging down below it, and Fig. 2 shows how the other pivot 15 is used when the device is inverted with the end of the tape 6 fixed and the load directly suspended from the body lug 2.

Figs. 3 and 4 illustrate how the load capacity can be doubled by anchoring the end of the tape 6 to the pawl pivot 15 which at the time is not being used. The doubled tape passes through a ring to which the load is attached, the doubled load capacity being achieved at the expense of half the height adjustment movement per drum revolution, as normally applies with a simple single pulley system.

The modification of Fig. 5 exhibits two main changes. Firstly, the fixing lug 2 is omitted and instead

the body 1 has a second peripheral slot 17 diametrically opposite to the slot 7. Secondly, an additional tape 18 is provided which is also wound on to the drum 5 and extends from the housing 1 through the slot 17. The tapes 6 and 18 are wound on as interleaved windings, so that they both extend or contract together and height adjustment movement is doubled per drum revolution. One of the tapes 18 is anchored above and the load is directly suspended from the other tape 6, the body 1 remaining suspended midway between the upper anchorage point and the load.

C L A I M S

1. An extendible suspension device comprising a
5 rotatably mounted drum, an elongate flexible suspender
member wound on to the drum and extendible therefrom,
means urging the drum in the winding-on direction, at
least one eccentric projection rotatable with the drum,
and a pawl with a notch or recess engageable by the
10 projection for locking the drum against movement in the
unwinding direction and for allowing, when the suspender
member is unwound at or above a certain speed so as to
extend the device, the projection to overrun the pawl
without operatively engaging the notch or recess.

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2. An extendible suspension device as claimed in
Claim 1, wherein said projection projects generally
radially from the rotational axis of the drum.

20 3. An extendible suspension device as claimed in
Claim 1 or 2, wherein said projection is one of a
plurality of equiangularly spaced projections formed
integrally with the drum, or on a member secured to or
rotatably coupled with the drum.

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4. An extendible suspension device as claimed in
any preceding claim, wherein the pawl is pivotally
mounted about an axis parallel to the axis of rotation

of the drum.

5. An extendible suspension device as claimed in any preceding claim, wherein the pawl is gravity urged
5 for engagement with the or each projection.

6. An extendible suspension device as claimed in any preceding claim, wherein two pivot mountings for the pawl are provided, to allow selective operation of the
10 device in different orientations.

7. An extendible suspension device as claimed in Claim 6, comprising two diametrically opposite pivot mountings for allowing the main body of the device to be
15 inverted so that it can be employed either with the body of the device fixed and a load suspended on the suspender member, or with the end of the suspender member anchored and the load directly suspended from the body.

20 8. An extendible suspension device as claimed in any preceding claim, wherein the pawl is one of a number of alternatively operable pawls for allowing selective operation of the device in different orientations.

25 9. An extendible suspension device as claimed in any preceding claim, wherein the body of the device is a two-part circular moulded structure.

10. An extendible suspension device as claimed in any preceding claim, wherein the or each pawl pivot comprises a pivot stub moulded integrally with the body
5 of the device.

11. An extendible suspension device as claimed in any of claims 1 to 9, wherein the or each pawl pivot comprises a stub moulded integrally with the pawl and
10 engaging aligned bores in two body parts of the device.

12. An extendible suspension device as claimed in any of claims 1 to 9, wherein the or each pawl pivot comprises a separate pivot element located in the body
15 of the device.

13. An extendible suspension device as claimed in any preceding claim, wherein the suspender member is a flexible webbing or tape wound on the drum as a single
20 width spiral.

14. An extendible suspension device as claimed in any preceding claim, wherein the body of the device is moulded with an apertured suspension lug or other
25 attachment means.

15. An extendible suspension device as claimed in any preceding claim, wherein the suspender member is one

of two such members which are wound on the drum as mutually interleaved spirals and which extend from the body of the device in diametrically opposite directions.

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16. An extendible suspension device as claimed in any preceding claim, wherein anchorage means is provided on the body of the device for attachment to an end of the suspender member so as to form a doubled
10 suspender member, and a slidable attachment is provided for supporting a load on the doubled suspender member.

17. An extendible suspension device as claimed in Claim 16 when appended directly or indirectly to Claim
15 6, wherein the anchorage means is one of said two pawl pivot mountings which is not, at the time, being used to mount a pawl.

18. An extendible suspension device as claimed in
20 any preceding claim, wherein the drum is urged in the winding-on direction by a torsion spring disposed within the drum.

19. An extendible suspension device as claimed in
25 claim 18, wherein said torsion spring is a flat wound spring.

20. An extendible suspension device substantially

-13-

as hereinbefore described with reference to any of the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number
9120550.0

Relevant Technical fields

(i) UK CI (Edition K) B8M:MB7, MB8 F2E

(ii) Int CI (Edition 5) B65H, F16D

Databases (see over)

(i) UK Patent Office

(ii)

Search Examiner

G WERRETT

Date of Search

17 DECEMBER 1991

Documents considered relevant following a search in respect of claims 1 TO 20

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 696612 (J B PILLIN) whole document	1, 3

Category	Title of document and relevant passages	Relevant to claim(s)

Categories of documents

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